APPENDIX

1. (Amended) A composition comprising a first and second nucleic acid probe, said first probe hybridizing with an ABL nucleic acid flanking sequence and said second probe hybridizing with a BCR nucleic acid flanking sequence, said flanking sequences brought together by a chromosomal aberration.

2. (Amended) The composition of claim 1 wherein the probes are labeled.

3. (Amended) The composition of claim 2 wherein each probe label is distinct from each other.

4. (Amended) The composition of claim 3 wherein the probes hybridize to sequences that are at least approximately 800 kb apart in the aberrant chromosome .

5. (Amended) The composition of claim 4 wherein the labels comprise fluorescent labels.

6. (Amended) The composition of claim 5 wherein the fluorescent labels are distinguishable under a microscope as different colors.

7. (Amended) The composition of claim 6 wherein the fluorescent labels comprise digoxigenin-11-dUTP and biotin-11-dUTP.

8. (Amended) The composition of claim 1 wherein the probes hybridize with chromosomal DNA *in situ* in cells.

9. (Amended) The composition of claim 8 wherein the cells comprise those in interphase of mitotic division.

10. (Amended) The composition of claim 9 wherein the probes after hybridization are juxtaposed as doublets if a chromosomal aberration is present.

11. (Amended) The composition of claim 10 wherein the chromosomal aberration is further defined as comprising a translocation.

12. (Amended) The composition of claim 11 wherein the translocation is formed by breakpoints which occur on the long arms of human chromosomes No. 9 and No. 22.

13. (Amended) The composition of claim 12 wherein the translocation breakpoints are further defined as occurring at the locations designated t(9;22) (q11;q34).

14. (Amended) The composition of claim 13 wherein the translocation breakpoints are further defined to occur in the BCR and ABL genes respectively, and a fusion gene is formed by the translocation, and said fusion gene comprises portions of the BCR and ABL genes.

15. (Amended) The composition of claim 14 wherein the fusion gene encodes a protein designated as p190.

16. (Amended) The composition of claim 10 wherein the probes consist of those selected from probes designated PEM12, c-H-abl and MSB-1.

17. (Amended) The composition of claim 8 wherein the cells comprise a sample of human tissue.

18. (Amended) The composition of claim 17 wherein the human tissue sample comprises peripheral blood.

19. (Amended) The composition of claim 17 wherein the human tissue sample comprises bone marrow.

20. (Amended) The composition of claim 8 wherein the cells comprise a sample of cultured cells.

21. A genetic probe capable of hybridizing to the 5' region of the major breakpoint cluster region (M-bcr) of chromosome 22 as illustrated in FIG. 2A and FIG. 4.

22. A genetic probe capable of hybridizing to the first exon region of the BCR gene as illustrated in FIG. 2A.

23. A genetic probe designated as c-H-abl and capable of hybridizing to the 3' end of the ABL gene as illustrated in FIG. 5 and FIGS. 2B and 2C.

24. (Amended) The genetic probe of claim 21 wherein the probe comprises PEM12.

25. (Amended) The genetic probe of claim 22 wherein the probe comprises MSB-1.

26. (Amended) The genetic probe of claim 23 wherein the probe comprises c-H-abl.

27. (Amended) The composition of claim 1 wherein the first and second probes comprise c-H-abl and MSB-1.

28. (Amended) The composition of claim 1 wherein the first and second probes comprise c-H-abl and PEM12.

29. (Amended) A kit for the detection of chromosomal aberrations comprising at least two genetic probes selected from claims 21, 22 and 23, and a control, each in separate containers.

30. A kit for the detection of cancer in human cells, comprising:

a) a carrier being compartmentalized to hold multiple containers;

b) a first pair of containers including the pair of genetic probes of claims 21 and 23; and

c) a second pair of containers containing the pair of genetic probes of claims 22 and 23.

31. (New) The composition of claim 14 wherein the fusion gene encodes either of two proteins designated as p190 and p210.

32. (New) The composition of claim 31 wherein the presence of said fusion gene is diagnostic for acute lymphocytic leukemia (ALL).

33. (New) The composition of claim 31 wherein the presence of said chromosomal aberration is diagnostic or prognostic for ALL and chronic myelogenous leukemia (CML).